Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for producing a metal ion-specific capacity affinity sensor suitable for determining the presence of a certain heavy metal ion of interest in a contacting solution by capacitance measurement, comprising the steps of:

a) providing a piece of a noble metal having a surface~~, where said piece optionally can be a rod, or alternatively a piece of insulating material such as glass, silicon or quartz, on which a noble metal is sputtered or printed~~;

b) providing a first self-assembling monolayer-forming molecule comprising a coupling group;

c) contacting said noble metal ~~the~~ piece in step a) with the first self-assembling monolayer-forming molecule in step b), thereby obtaining a first self-assembling monolayer on said ~~noble metal~~ surface of said noble metal piece;

d) contacting said first self-assembling monolayer on said noble metal piece with a molecule specifically binding said heavy metal ion, thereby coupling said molecule to said first ~~the~~ self-assembling monolayer;

e) contacting the piece obtained in step d) with a second self-assembling monolayer-forming molecule, thereby obtaining a noble metal surface that is at least 90%~~, preferably at least 95%, more preferably at least 97%, and most preferably at least 99%~~ covered with a self-assembling monolayer.

2. (Currently Amended) A method according to claim 1, characterized in that the coupling reaction in step d) is carried out in presence of polyethylene-glycol-di-glycidyl-ether~~PEGDGE~~.

3. (Currently Amended) A method according to claim 1, characterized in that said noble metal ~~the~~ piece is exposed to a solution containing a crosslinking substance ~~such as glutaraldehyde~~ prior to step d).

4. (Currently Amended) A method according to claim 1, characterized in that said ~~the~~ first self-assembling monolayer-forming molecule is D/L-thioctic acid, and in that said D/L-thioctic acid is activated with 1-(3-dimethylaminopropyl)-3-ethyl-carbodiimide before step d) is carried out.

5. (Currently Amended) A method according to claim 1, characterized in that said ~~the~~ second self-assembling monolayer-forming molecule is a thiol comprising 3-25 carbon atoms in a straight saturated chain~~, and preferably is 1-dodecanethiol~~.

6. (Currently Amended) A metal ion-specific capacity affinity sensor comprising a piece of a noble metal having a surface ~~, where said piece optionally can be a rod, or alternatively a piece of insulating material such as glass, silicon or quartz, on which a noble metal is sputtered,~~ to which molecules ~~piece groups~~ specifically binding ~~to~~ a certain heavy metal ion of interest have been bound, characterized in that said molecules ~~groups~~ specifically binding to said heavy metal ion are coupled ~~bound~~ to a self-assembling monolayer covering at least 90%~~, preferably at least 95%, more preferably at least 97%, and most preferably at least 99%~~ of said ~~the noble metal~~ surface of said noble metal piece, and characterized in that said sensor has been produced by a method according to any one of claims 1-~~56~~.

7. (Currently Amended) A sensor according to claim 6, characterized in that said molecules specifically binding to said heavy metal ion ~~binding groups~~ are selected from the group of proteins consisting of ~~having the sequences~~ SEQ.ID.NO.1, SEQ.ID.NO.2, SEQ.ID.NO.3, ~~or~~ SEQ.ID.NO.4, and ~~or~~ functional derivatives thereof, wherein the functional derivatives have ~~having equivalent~~ binding characteristics equivalent to SEQ.ID.NO.1, SEQ.ID.NO.2, SEQ.ID.NO.3, or SEQ.ID.NO.4.

8. (Currently Amended) A method for qualitatively ~~or quantitatively~~ determining the presence of a certain heavy metal ion of interest in a liquid sample, comprising the steps of:

a) providing a sensor according to claim 6~~, wherein said affinity groups specifically binds to said heavy metal ion of interest~~;

b) contacting said sensor with a reference liquid not containing said heavy metal ion of interest and determining the capacitance ~~according to per se known methods~~;

c) contacting said sensor with a liquid sample suspected of containing said heavy metal ion of interest and determining the capacitance ~~according to per se known methods~~; and

d) calculating the difference between the capacitance of the liquid sample and the capacitance of the reference liquid.~~sample, and optionally calculating the amount of said compound by using prerecorded calibration data.~~

9. (Currently Amended) A method according to claim 8, wherein said heavy metal ion of interest is ~~for determining the presence of ions~~ selected from the group consisting of Zn^{2+}, Hg^{2+}, Cd^{2+}, Cu^{2+}, and Pb^{2+}.

10. (Currently Amended) A method ~~Use of a sensor according to claim 6~~ for determining the presence of ~~of~~ ions selected from the group consisting of Zn^{2+}, Hg^{2+}, Cd^{2+}, Cu^{2+} and Pb^{2+}~~,~~, comprising using a sensor according to claim 6 to determine the presence of said ions.

11. (New) A method according to claim 1, wherein said piece of a noble metal in step a) is a rod.

12. (New) A method according to claim 1, wherein said piece of a noble metal in step a) is a piece of insulating material on which a noble metal is sputtered or printed.

13. (New) A method according to claim 12, wherein said piece of insulating material is comprised of a substance selected from the group consisting of glass, silicon, and quartz.

14. (New) A method according to claim 1, wherein the noble metal surface obtained in step e) is at least 95% covered with a self-assembling monolayer.

15. (New) A method according to claim 1, wherein the noble metal surface obtained in step e) is at least 97% covered with a self-assembling monolayer.

16. (New) A method according to claim 1, wherein the noble metal surface obtained in step e) is at least 99% covered with a self-assembling monolayer.

17. (New) A method according to claim 3, wherein said crosslinking substance is glutaraldehyde.

18. (New) A method according to claim 5, wherein said second self-assembling monolayer-forming molecule is 1-dodecanethiol.

19. (New) A sensor according to claim 6, wherein said piece of a noble metal is a rod.

20. (New) A sensor according to claim 6, wherein said piece of a noble metal is a piece of insulating material on which a noble metal is sputtered.

21. (New) A sensor according to claim 20, wherein said piece of insulating material is comprised of a substance selected from the group consisting of glass, silicon, and quartz.

22. (New) A sensor according to claim 6, wherein said surface of said noble metal piece is at least 95% covered with a self-assembling monolayer.

23. (New) A sensor according to claim 6, wherein said surface of said noble metal piece is at least 97% covered with a self-assembling monolayer.

24. (New) A sensor according to claim 6, wherein said surface of said noble metal piece is at least 99% covered with a self-assembling monolayer.

25. (New) A method for quantitatively determining the presence of a certain heavy metal ion of interest in a liquid sample, comprising the steps of:

a) providing a sensor according to claim 6;

b) contacting said sensor with a reference liquid not containing said heavy metal ion of interest and determining the capacitance;

c) contacting said sensor with a liquid sample suspected of containing said heavy metal ion of interest and determining the capacitance;

d) calculating the difference between the capacitance of the liquid sample and the capacitance of the reference liquid; and

e) calculating the amount of said heavy metal ion of interest using prerecorded calibration data.